

**Montana Board of Oil and Gas Conservation
Environmental Assessment**

Operator: Petroshale Energy LLC
Well Name/Number: Arrowhead 1A
Location: NW SW NW Section 34 T15N R16E
County: Fergus, **MT;** **Field (or Wildcat)** Wildcat

Air Quality

(possible concerns)

Long drilling time: No short, 5 to 10 days drilling time.

Unusually deep drilling (high horsepower rig): No, small single drilling rig to drill to a 3,150' TD, Otter Formation test.

Possible H₂S gas production: None anticipated.

In/near Class I air quality area: Not in a Class I air quality area.

Air quality permit for flaring/venting (if productive): Yes, DEQ air quality permit required under 75-2-211.

Mitigation:

☒ Air quality permit (AQB review)

☐ Gas plants/pipelines available for sour gas

☐ Special equipment/procedures requirements

☐ Other: _____

Comments: Small single derrick drilling rig to drill to 3,150' TD.

Water Quality

(possible concerns)

Salt/oil based mud: No, air, freshwater and freshwater mud system to be used.

High water table: No, high water table expected.

Surface drainage leads to live water: Closest drainages are unnamed ephemeral tributary drainages Ross Fork Creek, about 1/32 of a mile to the southwest and about 1/8 of a mile to the northeast from this location.

Water well contamination: None, closest water well is about 3/4 of a mile to the southwest from this location, depth of this water well is 22'. Spring is shown on the topographic map about 5/8 of a mile to the southwest from this location. Surface hole will be drilled with freshwater to 310'. Steel surface casing will be run and cemented to surface to protect ground waters.

Porous/permeable soils: No, sandy clay soils.

Class I stream drainage: No, Class I stream drainages nearby.

Mitigation:

☐ Lined reserve pit

☒ Adequate surface casing

☐ Berms/dykes, re-routed drainage

☐ Closed mud system

☐ Off-site disposal of solids/liquids (in approved facility)
☐ Other: _____
Comments: Adequate surface casing to be set to 310' to protect surface water and water wells and springs.

Soils/Vegetation/Land Use

(possible concerns)
Stream crossings: No, streams to be crossed; only crossing ephemeral drainages along the county road.
High erosion potential: No, small cut up to 2.2' and small fill up to 1.9', required.
Loss of soil productivity: No, location will be restored after drilling, if nonproductive. If productive unused portion of drillsite will be reclaimed.
Unusually large wellsite: No, small drillsite, 200' X 200'.
Damage to improvements: Slight, surface use is cultivated land.
Conflict with existing land use/values: Slight

Mitigation

- ☐ Avoid improvements (topographic tolerance)
- ☐ Exception location requested
- ☒ Stockpile topsoil
- ☐ Stream Crossing Permit (other agency review)
- ☒ Reclaim unused part of wellsite if productive
- ☐ Special construction methods to enhance reclamation
- ☐ Other _____

Comments: Will utilize existing county, Ross Fork Road. Short access off existing county road, Ross Fork Road will be build into this location, about 811'. Unlined earthen pits will be utilized for drilling. Drilling fluids, mud solids and cuttings will be allowed to dry in the pits. When pits are dry they will be filled in with subsoil and topsoil spread.

Health Hazards/Noise

(possible concerns)
Proximity to public facilities/residences: Closest residences are about 7/8 of a mile to the east southeast and about 1.125 miles to the southeast from this location.
Possibility of H2S: None anticipated.
Size of rig/length of drilling time: Small single derrick drilling rig/Short drilling time 5 to 10 days.

Mitigation:

- ☒ Proper BOP equipment
- ☐ Topographic sound barriers
- ☐ H2S contingency and/or evacuation plan
- ☐ Special equipment/procedures requirements
- ☐ Other: _____

Comments: Adequate amount of surface casing and operational BOP equipment should mitigate any problems.

Wildlife/recreation

(possible concerns)

Proximity to sensitive wildlife areas (DFWP identified): None identified.

Proximity to recreation sites: None identified.

Creation of new access to wildlife habitat: None

Conflict with game range/refuge management: None

Threatened or endangered Species: Threatened or endangered species identified are the Pallid Sturgeon and Black-Footed Ferret. Species of concern is the Greater Sage Grouse and Sprague's Pipit. NH tracker website lists zero (0) species of concern in T15N R16E.

Mitigation:

☐ Avoidance (topographic tolerance/exception)

☒ Other agency review (DFWP, federal agencies, DSL)

☐ Screening/fencing of pits, drillsite

☐ Other: _____

Comments: Surface use is a private cultivated land. There may be species of concern that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to what he would like done, if a species of concern is discovered at this location. The Board of Oil & Gas has no jurisdiction over private surface lands.

Historical/Cultural/Paleontological

(possible concerns)

Proximity to known sites None identified

Mitigation

☐ avoidance (topographic tolerance, location exception)

☒ other agency review (SHPO, DSL, federal agencies)

☐ Other: _____

Comments: Surface use is a private cultivated land. There may be possible historical/cultural/paleontological sites that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to his desires to preserve these sites or not, if they are found during construction of the wellsite. The Board of Oil & Gas has no jurisdiction over private surface lands.

Social/Economic

(possible concerns)

☐ Substantial effect on tax base

☐ Create demand for new governmental services

☐ Population increase or relocation

Comments: No, impact expected from the drilling of this well.

Remarks or Special Concerns for this site

No special concerns about this wellsite. This is a Heath Formation test to be drilled to 3150' TD, Otter Formation test well.

Summary: Evaluation of Impacts and Cumulative effects

No significant or long term impacts expected from the drilling of this well. Some short term impacts will occur.

I conclude that the approval of the subject Notice of Intent to Drill (does/**does not**) constitute a major action of state government significantly affecting the quality of the human environment, and (does/**does not**) require the preparation of an environmental impact statement.

Prepared by (BOGC): /s/Steven Sasaki

(title:) Chief Field Inspector

Date: October 5, 2011

Other Persons Contacted:

Montana Bureau of Mines and Geology, GWIC
website

(Name and Agency)

Fergus County water wells

(subject discussed)

October 5, 2011

(date)

US Fish and Wildlife, Region 6 website

(Name and Agency)

ENDANGERED, THREATENED, PROPOSED AND CANDIDATE SPECIES

MONTANA COUNTIES, Fergus County

(subject discussed)

October 5, 2011

(date)

Montana Natural Heritage Program Website (FWP)

(Name and Agency)

Heritage State Rank= S1, S2, S3, T15N R16E

(subject discussed)

October 5, 2011

(date)

If location was inspected before permit approval:

Inspection date: _____

Inspector: _____

Others present during inspection: _____